4T2
Paper 2 : Artificial Intelligence & Expert System

Unit-1 :
AI problems, AI Techniques, Tic-tac-toe, Question Answering, Problem as a state space search, A water jug problem, production system, Control strategies, Heuristic Search, Problem Characteristics, Production system characteristics, Design of search programs
AI Search techniques :- Depth-first, Breadth-first search, Generate-and-test, Hill climbing, Best-first search, Constraint satisfaction, Mean-ends-analysis, A* Algorithm, AO* algorithm.

Unit-2 :
Knowledge Representation:- Representations and mappings, Knowledge Representations, Issues in Knowledge Representation, Predicate Logic:- Representing Instance and Isa Relationships, Computable Functions and predicates, Resolution, Natural Deduction, Logc programming, Forward versus Backward Reasoning, Matching, Control knowledge, Expert System.

Unit-3 :
Games playing : Minimax search procedure , adding alpha-beta cutoffs, additional refinements,
Planning :- Component of a planning system, Goal task planning, Nonlinear planning, Hierarchical Planning.

Unit-4 :
Understanding, Understanding as Constraint satisfaction, Natural Language Processing, Syntactic Processing, Unification grammars, Semantic Analysis, Introduction to pattern recognition, Parallel and Distributed AI, Psychological Modeling, Distributed Reasoning Systems,

Books :

1. Artificial Intelligence by Elaine Rich, Mcgrawhill Inc.
2. Artificial Intelligence and Expert Systems – Jankiraman, Sarukes (M)

Reference Books:

1. Expert System : Theory and Practice- Ermine (PHI)
2. Lisp Programming – Rajeo Sangal – (TMH)
3. Rule based Expert System – M.Sasikumar (Narosa)
4. Artificial intelligence – Russell-Pearson- Ist Text book.
5. Principles of AI- Nils Nilson
6. A.I. by R.J.Winston - Pearson
7. ES : Theory and Practice- Ermine – PHI.
8. Int. ti Expert System – Jackson – Pearson.

4T3
Paper 3 : CE2-1 (Core Elective 2)

Design and Analysis of Algorithm

Unit-1 :
Elementary Algorithmics: Introduction- Problems and Instances- The Efficiency of algorithms- Average and worst case Analysis. Asymptotic Notation: A notation for the order of – Other asymptotic notation- Conditional asymptotic notation- Asymptotic notation with several parameters- Operations on asymptotic notation.
Analysis of Algorithms: Introduction- Analyzing control structures- Average case analysis- Amortized Analysis- Solving recurrences.

Unit-2 :
Greedy Algorithms: Making change- General Characteristics of Greedy algorithms- Minimum spanning trees and shortest paths- Knapsack Problems- Scheduling.
Divide and Conquer: Introduction- Multiplying large numbers- The general template- binary search- sorting- Finding the median- Matrix multiplication- Introduction to cryptography.

Unit-3 :
Dynamic Programming: The Principle of Optimality- making change the knapsack problem- shortest paths- Chained matrix multiplication- approaches using recursion- Memory functions.

Unit-4 :
Back tracking & Brach Bound: Traversing trees- Depth first search of directed and ndirected graph- *Breadth first search-* Back tracking- Branch and bound- The minimax principle, Introduction to NP- *Completeness; Classes* P and NP- Polynomial reductions- NP- Complete Problems NP- Hard problems- *Non- Deterministic* algorithms.

Books :

1. Fundamentals of Algorithms - Gilles Brassard & Paul Brately. Prentice-Hall (India)Ltd.

Reference Books:

1. Fundamentals of Computer Algorithms by Ellis Horowitz & Sartaj Sahani. Galgotia Publication.
2. Computer Algorithms: Introduction to Design & Analysis. Sara Baase & Alien Van Gelder. Addison Wesley Publishing Company.

M.Sc. (Computer Science)
Semester IV
4T1
Paper 1 : Data Mining

Unit-1 :

Introduction to Data Mining: Why Mine Data? Commercial Viewpoint, Scientific Viewpoint Motivation, Definitions, Origins of Data Mining, Data Mining Tasks, Classification, Clustering, Association Rule Discovery, Sequential Pattern Discovery, Regression, Challenges of Data Mining, Data Mining-Data: What is Data? Attribute Values, Measurement of Length, Types and Properties of Attributes, Discrete and Continuous Attributes, Types of data sets, Data Quality, Data Preprocessing, Aggregation, Sampling, Dimensionality Reduction, Feature subset selection, Feature creation, Discretization and Binarization, Attribute Transformation, Density.

Unit-2 :

Data Mining: Exploring Data: Data Exploration Techniques, Summary Statistics, Frequency and Mode, Percentiles, Measures of Location: Mean and Median, Measures of Spread: Range and Variance, Visualization, Representation, Arrangement, Selection, Visualization Techniques: Histograms, , Box Plots, Scatter Plots, Contour Plots, Matrix Plots, Parallel Coordinates, Other Visualization Techniques, OLAP : OLAP Operations, Data Mining Classification: Bask Concepts, Decision Trees, and Model Evaluation: Classification: Definition, Classification Techniques, Tree Induction, Measures of Node Impurity, Practical Issues of Classification, ROC curve, Confidence Interval for Accuracy, Comparing Performance of Two Models, Comparing Performance of Two Algorithms.

Unit-3 :

Data Mining Classification: Alternative Techniques: Rule-Based Classifier, Rule Ordering Schemes, Building Classification Rules, Instance-Based Classifiers, Nearest Neighbor Classifiers, Bayes Classifier, Naive Bayes Classifier, Artificial Neural Networks (ANN), Support Vector Machines. Data Mining Association Analysis: Basic Concepts and Algorithms: Association Rule Mining, Frequent Itemset Generation, Association Rule Discovery : Hash tree, Factors Affecting Complexity, Maximal Frequent Horible Closed Itemset, Alternative Methods for Frequent Itemset Generation, FPgrowth Algorithm, Tree Projection, Rule Generation, Pattern Evaluation, Statistical Independence, Properties of A Good Measure, Support-based Pruning, Subjective Interestingness Measure.

Unit-4 :

Data Mining Cluster Analysis: Basic Concepts and Algorithms: Applications of Cluster Analysis, Types of Clusters, Clustering Algorithms: 'K-means and its variants, Hierarchical clustering, Density based clustering. Graph-Based Clustering, Limitations of Current Merging Schemes, Characteristics of Spatial Data Sets, Shared Near Neighbor Approach, ROCK (RObust Clustering using linKs), Jarvis Patrick Clustering, SNN Clustering Algorithm, Data Mining Anomaly Detection: Anomaly jOutlier Detection, Importance, Anomaly Detection Schemes, Density-based: LOF approach

Books :

1. Introduction to Data Mining by Tan, Steinbach, Kumar.
2. Data Mining: Concepts and Techniques by Jiawei Han, Micheline Kamber, Morgan Kaufmann

Reference Books:

1. Data Mining: Practical Machine Learning Tools and Techniques by Ian H. Witten and Eibe Frank, Morgan Kaufmann, 2nd Edition (2005).
2. Principles of Data Mining: David Hand, Heikki Mannila & Padhraic Smyth, PHP Publication.

4T4
Paper 4 : FC2 (Foundation 2)
Advances in Information Technology

Unit I:

Software and programming languages. Introduction, The Software: Software types, Systems Software, Application Software, Types of Programming Languages. Characteristics of good programming language, Development of programming languages-machine language, assembly language, high level language. Introduction to Microsoft Office, working with MS Word, MS Excel, MS Power point, Data Base, Data Base Management System

Unit II:

Computer communication, need for networks, forms of data communication – analog, digital; data transmission modes, data transmission media (Twisted pair, co-axial, Fibre Optic, Microwave, Satellite communication), Bandwidth, Protocols, modems, Multiplexing, Types of network-, LAN, WAN, MAN, Network topology, types of topologies, advantages & limitations .

Unit III:

Concept of E-Commerce and Internet. Brief history and development of internet, WWW, Internet architecture – servers, browsers, URL; service providers – shell account, TCP/IP internet services and Internet applications , Intranet, Extranet, Virus, Types of Viruses, Anti-Virus, Firewall and Anti-Spy ware Utilities, Open Source Software.

Unit IV:

Current Trends in Wireless communication: Mobile Internet, GPS, 3G, 4G, Wi-Fi, Bluetooth, Wireless Application Protocol,

Electronic Commerce, Types of E-Commerce and their utilities, M-Commerce.

Advanced Trends in IT - Mobile Computing, Cloud Technology, Bioinformatics, Virtual Reality, Neural Network, Grid Computing, Intelligent Software Agent, , Virtual LAN Technology, Distributed Computing, OLAP, Data Mining, BPO & KPO, Artificial Intelligence & Expert System, ERP, E-Banking.

Books:

1) Dr. Madhulika Jain, Shashank & Satish Jain ,"Information technology Concepts", BPB Publication, New Delhi, ISBN-- 8176562769

2) Information Technology - Dr. Sushila Madan (Taxmann's)

3) Computer Fundamentals By P. K. Sinha

4) Business On The Net An Introduction To The Whats And Hows Of Ecommerce By K. N. Agarwala & Others (Macmilan)

5) Verma,"Computer, Internet & Multimedia – Dictionary", Universities Press